## CLAIMS

1. A microfluidic system, comprising:

a substrate;

an array of drive electrodes carried by the substrate;

a dielectric carried by the substrate, overlying at least a portion of the array of drive electrodes;

a fluid compatibility layer overlying the array of drive electrodes; and

at least one ground electrode carried by the substrate, overlying at least a portion of the dielectric to provide a ground potential to at least one fluidic body.

2. The microfluidic system of claim 1, further comprising:

an array of transistors, the transistors electrically coupled to respective ones of the drive electrodes in the array of drive electrodes to control a respective potential applied to respective portions of the dielectric overlying the drive electrodes to move the at least one fluidic body with respect to the drive electrodes.

3. The microfluidic system of claim 2, further comprising:

a controller programmable to execute a set of driver instructions and coupled to control the transistors of the array of transistors according to a set of driver instructions to supply the at least one voltage from the voltage source to the drive electrodes via the transistors.

4. The microfluidic system of claim 2 wherein the array of drive electrodes is a generally planar two-dimensional matrix, where successive drive electrodes in the array are activated to apply a different respective potential to the respective portions of the dielectric in the plane of travel of the at least one fluid body.

5. The microfluidic system of claim 1 wherein the transistors of the array of transistors are thin film transistors.

6. The microfluidic system of claim 1, further comprising:

at least one voltage source for supplying at least one voltage;

7. The microfluidic system of claim 1, further comprising:

a computing system; and

a computer-readable medium having a set of computer animation instructions for causing the computing system to create the set of driver instructions in response to user input.

8. The microfluidic system of claim 1 wherein each of the drive electrodes have a dimension less than a lateral dimension of the at least one fluid body.

9. The microfluidic system of claim 1 wherein the fluid compatibility layer is hydrophobic.

10. The microfluidic system of claim 1 wherein an interior microfluidic structure is open to an ambient environment in use.

11. The microfluidic system of claim 1 wherein at least a portion of the dielectric is exposed to an exterior of microfluidic structure in use.

12. The microfluidic system of claim 1 wherein an exposed surface of the at least one ground electrode is flush with an exposed surface of the fluid compatibility layer.

13. A method of forming a microfluidic structure for manipulating at least one fluid body, the method comprising:

providing a first plate;

forming an array of drive electrodes overlying at least a portion of the first plate, the drive electrodes having a dimension less than a lateral dimension of the at least one fluid body;

forming a fluid compatibility layer overlying the array of drive electrodes; and

forming at least one ground electrode carried by the substrate and positioned to provide a ground potential to the at least one fluid body.

14. The method of claim 13, further comprising:

forming an array of transistors overlying at least a portion of the first plate, the transistors electrically coupled to control the drive electrodes; and

15. The method of claim 14 wherein forming an array of drive electrodes overlying at least a portion of the first plate includes forming a two-dimensional matrix array of electrodes, and wherein forming an array of transistors comprises forming a two-dimensional matrix array of thin film transistors electrically coupled to respective ones of the drive electrodes.

16. The method of claim 14 wherein forming a fluid compatibility layer overlying the array of drive electrodes comprises depositing a hydrophobic material over the array of drive electrodes, the fluid compatibility layer exposed to an exterior of the microfluidic structure during use.

17. The method of claim 13, further comprising:

forming a first fluid compatibility coating overlying the at least one ground electrode, the first fluid compatibility coating exposed to an exterior of the microfluidic structure during use.

18. The method of claim 13 wherein the at least one ground electrode overlies at least a portion of the dielectric.

19. A microfluidic system, comprising:

a substrate;

an array of drive electrodes carried by the substrate;

a fluid compatibility layer overlying the array of drive electrodes; and

at least one ground electrode carried by the substrate, positioned with respect to the fluid compatibility layer so as to provide a ground potential to at least one fluidic body.

20. The microfluidic system of claim 19 wherein an exposed surface of the ground electrode is flush with an exposed surface of the fluid compatibility layer.

21. The microfluidic system of claim 19 wherein an exposed surface of the ground electrode is space below an exposed surface of the fluid compatibility layer.

22. The microfluidic system of claim 19, further comprising:

a dielectric carried by the substrate, overlying at least a portion of the array of drive electrodes.

23. The microfluidic system of claim 19 wherein the ground electrodes are spaced relatively above the array of drive electrodes with respect to the substrate, and the ground lies are each electrically coupled to a fixed ground potential.

24. A method of operating a microfluidic system, comprising:

determining a position of a cursor on a display;

receiving a first user selection;

identifying at least one of a position and a number of fluid bodies based on the position of the cursor in response to receiving the first user selection; and

producing at least one instruction for driving at least one of a number of drive electrodes and a number of ground electrodes based on the identification.

25. The method of claim 24, further comprising:

storing the at least one instruction for later execution.

26. The method of claim 24, further comprising:

executing the at last one instruction.

27. The method of claim 24, further comprising:

immediately executing the at last one instruction.

28. The method of claim 24, further comprising:

immediately executing the at last one instruction; and

storing the at least one instruction for later execution.

29. The method of claim 24 wherein identifying at least one of a position and a number of fluid bodies based on the position of the cursor in response to receiving the user selection includes identifying at least one of a starting position, ending position and an intermediate position.

30. The method of claim 24, further comprising:

receiving a second user selection;

identifying at least one operation to perform on the number of fluid bodies in response to receiving the second user selection; and

producing at least one instruction for driving at least one of a number of drive electrodes and a number of ground electrodes based on the at least one identified operation.